

### **REMARKS**

Claims 1-13 are pending in this application. Claims 4-13 have been withdrawn from consideration as being directed to a non-elected species of invention, and claims 1-3 have been rejected. Claim 1 has been revised to attend to matters of form. Claims 31, 49 and 50 are independent.

### **CONDITIONAL REQUEST FOR INTERVIEW**

Applicant respectfully requests that, in the event the Examiner does not deem this application to be in condition for allowance, Applicant's undersigned attorney be granted an interview with the Examiner to discuss any remaining points of objection and/or rejection. The Examiner is respectfully requested to contact the undersigned to schedule such an interview at a mutually-convenient time.

### **The Objection to the Claims**

Claim 1 has been objected to on grounds the term "the cycle" at line 12 should be changed to --the cycle information--, and the term "vary" at line 14 should read --varying--. Claim 1 has been revised to attend to these points.

Claims 2 and 3 were objected to because of alleged duplication of the term "wherein" at lines 2 and 3. The Office Action is in error, however, because this point already has been corrected in the Preliminary Amendment filed with this application on December 8, 2004.

Claim 4 was objected to as being of improper multiple dependent form. The Office Action is in error, however, because this point already has been corrected in the

Preliminary Amendment filed with this application on December 8, 2004. Also, it is noted that the Office Action has withdrawn claim 4 from consideration.

It is presumed that the Examiner, in preparing the Office Action, considered the claims as presented in the December 8 Preliminary Amendment. If, however, that is not correct, the Examiner is respectfully requested to advise Applicant's undersigned attorney of the same, and to take suitable corrective action.

For all the foregoing reasons, favorable reconsideration and withdrawal of these objections are respectfully requested.

**The Rejection Under  
35 U.S.C. § 103(a)**

Claims 1-3 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Appln. Publn. No. 2002/0012015 to Tsukada et al. in view of U.S. Patent No. 6,504,701 to Takamura et al. Applicant respectfully traverses this rejection, and submits the following arguments in support thereof.

Claim 1 concerns an expendable container that includes an expendable tank configured to store the expendable and having a piezoelectric element attached thereto, a detection signal generation circuit configured to charge and discharge the piezoelectric element, and generate a detection signal including cycle information, the cycle information representing a cycle of an output voltage wave of the piezoelectric element after the discharge, and a control module configured to control charging and discharging of the piezoelectric element. The cycle information is available for determining whether the residual quantity of the expendable exceeds a preset level, and the control module is able to vary a discharge characteristic of the piezoelectric element.

Tsukada is cited as teaching certain aspects of the claimed invention. However, the Office action **admits** at page 4 that Tsukada does not teach aspects of this invention such as the control module of claim 1 that can vary a discharge characteristic of the piezoelectric element. Also, the Office Action **admits** Tsukada does not teach the control module can vary the discharge time constant of the piezoelectric element as in claim 2, or vary the discharge time of the piezoelectric element as in claim 3.

Although the Office Action looks to Takamura to remedy Tsukada's admitted shortcomings, Takamura does not contain any such teachings.

The Office Action admits at page 4 that Takamura is concerned with a CMOS drive circuit for a piezoelectric member of an inkjet head (col. 5, lines 7-11; Figs. 16A-D). Takamura recognizes that while it would be desirable to drive a piezoelectric printer head using MOS transistors in place of bipolar transistors in order to reduce power consumption (col. 2, lines 5-10), it is difficult to do so at high recording speeds because a CMOS drive circuit driving the piezoelectric member using a high-speed cycle of charge, discharge, and reverse charge would cause current flow through a parasite diode that leads to low reliability and degradation of the circuit (col. 2, lines 15-60).

Having recognized this problem, Takamura seeks to provide a solution by using a technique that reduces the current flow through the parasite diode by setting the discharge time period and/or the discharge operation time period. Takamura states "[t]here has been no idea that a time period from when a decrease in an electrode voltage of an ink chamber constructed of a piezoelectric member gets started until an increase in electrode voltage of an adjacent ink chamber is level off is adjusted." (col. 2, lines 63-61).

Takamura therefore only is concerned with adjusting certain properties of a circuit for driving a piezoelectric recording head to improve head driving. That, however, is entirely different from, and not even suggestive of, the aspects of the claimed invention that the Office Action admits are missing from Tsukada. (and mistakenly contends are suggested by Takamura). Specifically, Takamura does not discuss providing a container for an expendable material that includes a sensor which detects an amount of the expendable material, much less that the control module does so by varying a discharge characteristic of the piezoelectric element.

As a result, when Tsukada and Takamura are combined, that does not lead to the claimed invention. Rather, this combination suggests at most that container having Tsukada's sensor also will have Takamura's structure for driving piezoelectric elements. However, the aspects of the present invention involving the control module that can vary a discharge characteristic (discharge is used in the sense of electrical discharge, not the expulsion of liquid) of the piezoelectric element that is involved with generating a detection signal still are not suggested.

Since Takamura does not teach the sensor for a container, Takamura cannot even suggest the aspects of the claimed invention involving the cycle of the drive circuit for a sensor. Takamura's teachings regarding the driver for the piezoelectric ejection element therefore could not lead to modifying Tsukada's piezoelectric member, which functions as a sensor, and does not eject fluid.

Still another reason why the cited references together do not suggest the claimed invention is because Takamura disclose a CMOS drive circuit that drives a piezoelectric

member, whereas Tsukuda discloses a sensing technique using a piezoelectric member. Since driving and sensing involve completely different techniques, there is no motivation that would lead one skilled in the art to combines teachings two completely different techniques, meaning the suggested combination is merely a hindsight reconstruction.

A further reason why this rejection is not proper is because, although when driving a piezoelectric member for the ejection (as in Takamura) there might be a motivation to change the discharge characteristic of the piezoelectric element for controlling the ejection amount, or for reducing the current flow through of the parasite diode, there is no motivation for changing the discharge characteristic of a component used in a sensing technique (such as that taught by Tsukada). Contrary to the Office Action's assertions, one of ordinary skill in the art would assume that there is no need to change the discharge characteristic for a sensing technique.

A finding of obviousness under 35 U.S.C. § 103(a) now must comply with the guidelines of the U.S. Patent and Trademark published and effective on October 10, 2007, entitled "Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in KSR International Co. v. Teleflex Inc.", 72 Fed. Reg. 57526 (2007) ("KSR Guidelines"). However, the outstanding rejection does not so comply.

The KSR Guidelines establish the following seven possible rationales for holding an invention to be obvious over a combination of references.

(A) Combining prior art elements according to known methods to yield predictable results;

(B) Simple substitution of one known element for another to obtain predictable results;

(C) Use of known technique to improve similar devices (methods, or products) in the same way;

(D) Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;

(E) "Obvious to try" -- choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;

(F) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to one of ordinary skill in the art;

(G) Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

None of those rationales support the current rejection. Specifically, none of these rationales would support an argument that a person of ordinary skill in the art could take a container such as that taught by Tsukada, having a piezoelectric sensor for detecting ink consumption and modify that sensor structure using aspects of the capacitive element drive device taught by Takamura. In particular, it will be appreciated that such modifications do not fall within the scope of rationale A, since such a combination would only lead to Tsukada's cartridge and sensor with Takamura's system for the ejection element driving circuitry. Nor do any of the other rationales support such a combination.

Accordingly, claim 1 patentably distinguishes over the cited art.

The remaining rejected claims, claims 2 and 3, both depend from and so incorporate by reference all the features of claim 1, including those features which have been shown to avoid the cited art. These claims therefore patentably distinguish over Tsukada and Takamura at least for the same reasons claim 1.

For all the foregoing reasons, favorable reconsideration and withdrawal of this rejection are respectfully requested.

### **CONCLUSION**

Favorable consideration and prompt allowance of this application are respectfully requested.

No fees are presently believed to be due in connection with the filing of this paper. If, however, any fees are deemed to be now or hereafter due in connection with this application, the Commissioner is authorized to charge all such fees to Deposit Account No. 19-4709.

In the event that there are any questions, or should additional information be required, please contact applicant's attorney at the number listed below.

Respectfully submitted,

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